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VIEW OF NEST NO. 1 OF THE FERRUGINOUS ROUGH-LEG. SHOWING GAP TO BE CROSSED.

THE FERRUGINOUS ROUGH-LEG, *ARCHIBUTEO FERRUGINEUS* IN MONTANA.

BY E. S. CAMERON.

Plates XIV-XVIII.

NESTING.

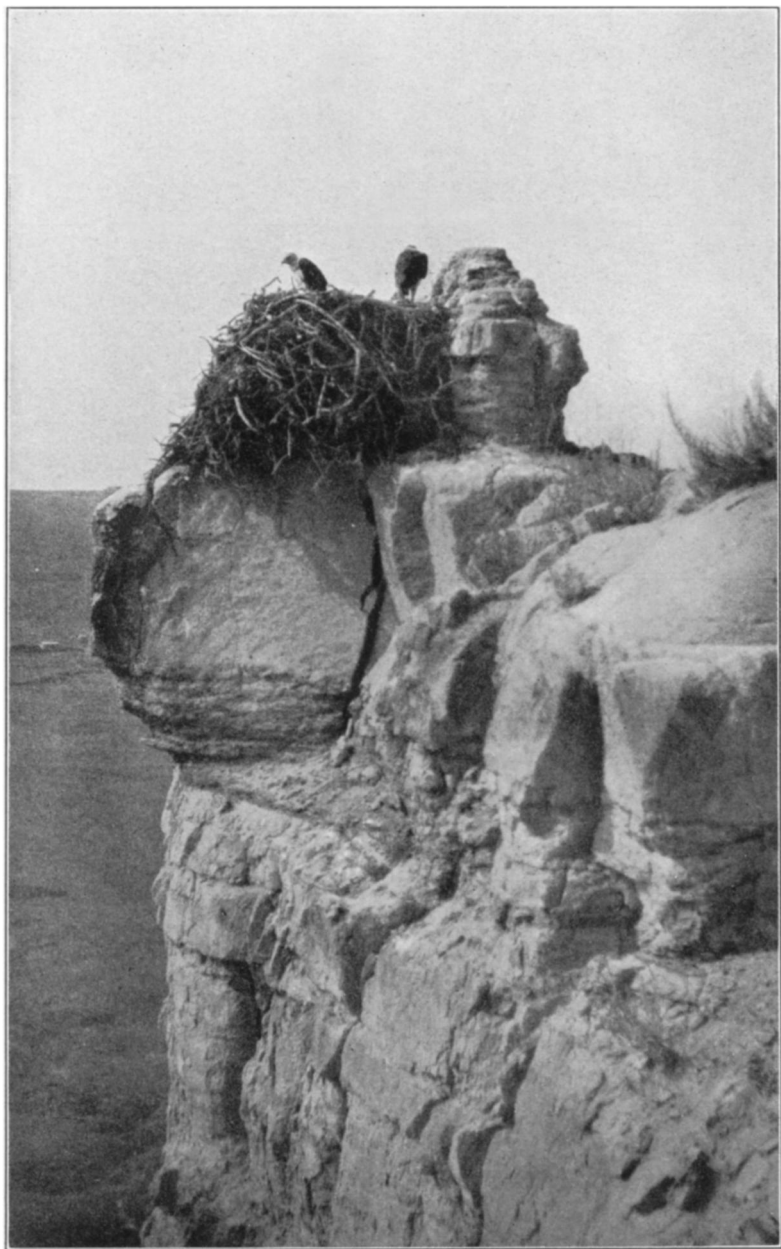
THIS splendid bird is undoubtedly the most powerful hawk met with in Montana, where it is usually called eagle, and its carrying power is remarkable as the sequel will show. It does no harm, but, on the contrary, wages unceasing warfare against such pests as prairie dogs (*Cynomys*), gophers (*Thomomys*), and meadow mice (*Arvicola*), and should therefore be universally protected; nevertheless it has unfortunately become very scarce, excepting in one or two favored localities where it is strictly preserved. Although a good deal has been written about the Ferruginous Rough-leg, as the hawk is called in the American Ornithologists' Union Check-list, I am not aware that it has hitherto been studied or photographed at the nest. It used to be abundant in Montana, as evidenced by the fact that Dr. J. A. Allen found it "next to *Falco sparverius*, the most common species of the Falconidae," and himself discovered several nests containing young. He continues: "The nest is often a very large bulky structure, sometimes three or four feet in diameter, built of coarse sticks, mixed with the ribs of antelopes and buffaloes. It is placed on the ground or rocks, usually near the summit of isolated buttes. The same nest is apparently occupied for a series of years and annually repaired."¹

I have seen the eyrie of this species in many varied situations in Montana; such as trees, on pillars or ledges of rock, and the shoulders or summits of badland buttes. The female begins to lay at any time from the middle of April until the end of the first week in May, according to the season, and deposits two, three or

¹ Proceedings of the Boston Society of Natural History, Vol. XVII., June, 1874.

four handsome eggs of variable shade, but usually with rich blotches of umber brown on a creamy or greenish white ground. The eggs are half as large again as those of the Common American Buzzard *Buteo swainsoni*. The Ferruginous Rough-leg appears to incubate for about twenty-five days, but I have not been able to time her exactly. The young birds are full-fledged and leave the nest when about two months old but do not acquire the full adult plumage for four or five years. Their call for the parents is at first soft and low, (like the piping of young Golden Eagles), but develops into a pleasing whistle by the time they are ready to leave the nest. The hungry fledglings become very excited when they see one of their parents approaching, and have a parrot-like trick of working their heads and necks while snapping their beaks at the same time. If handled, they resent it with their bills as well as their feet, and, in my experience, are the only raptores to use the bill in defending themselves. The Ferruginous Rough-leg is very fond of standing upon one leg, keeping the other concealed among the feathers, and is so depicted by Ridgway in Fisher's 'Hawks and Owls of The United States.' As Dr. Fisher well remarks (op. cit. p. 92, 93), "When this hawk is hunting its flight appears labored and heavy, but when circling in the air its flight is graceful and resembles closely that of the Golden Eagle."

My own endeavors to observe Ferruginous Rough-legs at the nest were to a great extent frustrated by outside interference. In 1899, a pair nested upon the apex of a badland butte near my ranch, and the female was sitting hard upon two eggs during the first week in May. The nest appeared to be in an unfavorable situation, exposed to every wind, was lined with dried grass, and composed of sage brush stalks, creeping cedar, and cedar drift-wood sticks. The latter were the largest sticks I have ever seen used in any nest, not excepting eyries of the Golden Eagle. Unfortunately, a road wound by the nesting site, and the hawk was wantonly killed before she had succeeded in hatching her nestlings. She might easily have escaped when first startled from the nest, but was unwilling to forsake her eggs, and flew screaming in circles above them until she was shot. The victim was a fully adult female, and in life must have been a truly magnificent bird. Her tail was entirely snow-white except for a few small streaks of bright chestnut, and



ANOTHER VIEW OF NEST NO. 1 WITH NESTLINGS.

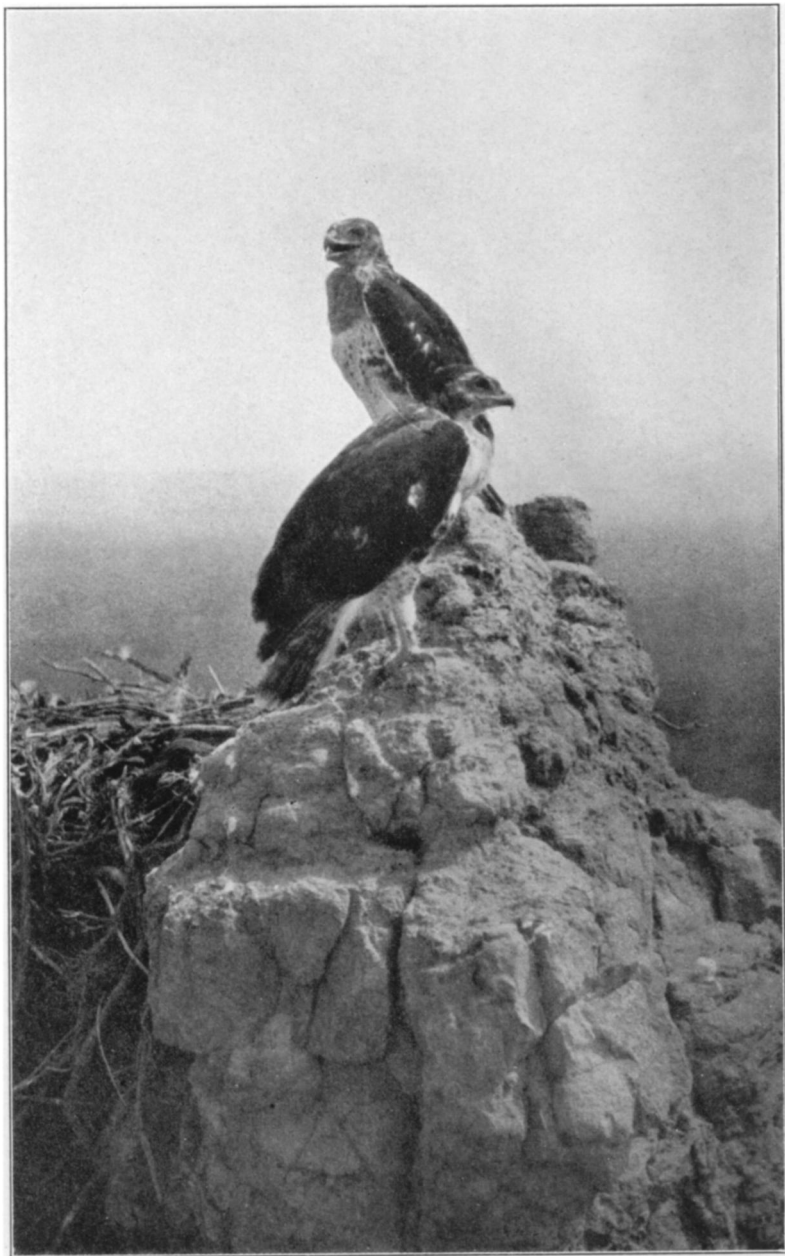
her legs and 'flags' were of the latter color barred with black. To the casual observer, the color of these parts will mark the chief difference between adult and immature birds. In first and second plumage, at least, the legs and thighs are of such pale buff as to appear white excepting in brilliant sunshine. Moreover, the tail of the young bird has four dark bars and is white for the basal half only, the terminal half being light slate color.

In May, 1905, a second pair of hawks constructed an eyrie in a cotton-wood tree about six miles from my Dawson County ranch. A shepherd who happened to camp with his sheep wagon at this place boiled and ate the three eggs, whereupon the disgusted birds deserted it. Yet a third pair nested upon a ledge of a high butte during 1908, when two eggs were laid, but the almost full-fledged young were discovered by some sheep shearers in July, who killed one and took the other captive. From three nests, therefore, no young birds were reared, and one adult was inexcusably sacrificed.

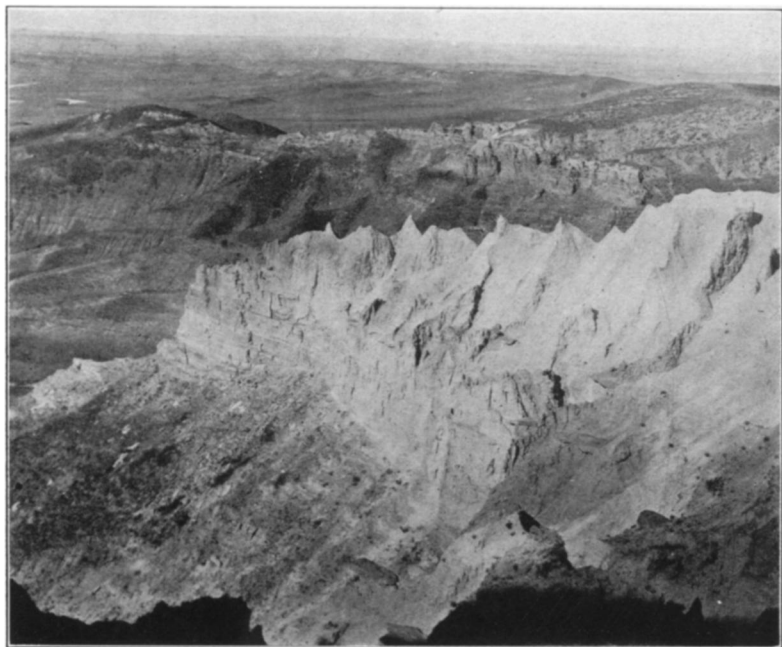
Last summer, Mr. W. R. Felton, an engineer of the Chicago, Milwaukee and Puget Sound Railway kept four nests of this hawk under observation for me, and visited them whenever his work of building a branch line between Lewiston and Great Falls allowed him time. These four nests were within a radius of four miles from the engineer's headquarters at the Square Butte Ranch, in Chouteau County, and others were reported seven miles away. Besides the above, Mr. Felton found four disused but well preserved eyries,—two of them within a quarter of a mile of an occupied nest. All eight nests were placed upon rocky ledges or points. They were constructed of the same materials, which consisted of sage brush and greasewood sticks, with some soapwood intermixed, and lined with dry cow manure. As will be seen from the measurements, the loose pile of sticks made the new nests remarkably high, but they settled considerably before the young had flown. A brief history of the four nests and their occupants condensed from Mr. Felton's notes follows: Nest No. 1, which was only two miles north of the Square Butte Ranch, and easily visible from there through powerful binoculars, was visited almost every day. This particular nest was picturesquely situated on a rocky point of the 'Chalk Cliffs' northeast of the geologically famous "Square Butte,"

which despite its modest name is an immense laccolith constituting an isolated spur of the Highwood mountains,— 2600 feet above the prairie. In reality the so called 'Chalk Cliffs' consist of an outcrop of white sandstone, chiefly in the centre of a range of grass-covered hills whose green summits rise in strong contrast above the white corrugated rocks. This sandstone stratum has been worn into a series of perpendicular cliffs, pure white above, but stained light brown below by lignitic matter and projecting spurs are carved into fantastic pinnacles and mounds. One promontory in particular is a regular sawtooth ridge. The nest here shown is poised upon the apex of a pillar which terminates a knife blade projection of 3537 feet elevation, and suggests in some photographs the prow of a ship. As there is a sheer vertical descent on three sides, and the surface of the connecting ridge suddenly breaks off leaving a wide fissure in the rock between it and the nest it is a task of no small difficulty to reach the latter and one best suited to a sailor or a cat. It can only be accomplished by approaching the eyrie from above, and then crawling along the ledge, when by dropping into and crossing the gap, which is well shown in the photograph, the nest can be attained. Mr. Felton, making light of the danger, climbed frequently to the nest, and made numerous exposures with a small Kodak, at the range of a few feet. The nest was four feet in height, and three and a half feet in diameter, and was higher than any Montana eyries of the Golden Eagle (*Aquila chrysaëtos*) known to me, which species had also nested in the 'Chalk Cliffs.'¹ The hawks carried green alfalfa to the nest for decorative purposes, and Mr. Felton noticed a fresh supply there on three separate occasions. When found on May 18, the eyrie contained three newly hatched young, but only two reached maturity, as one of the nestlings disappeared on July 9, when fifty-two days old. Mr. Felton conjectured that it had been blown out of the nest by a violent thunder storm, but the two stronger birds might have ejected their weaker brother. In any event, the outcast would soon have been picked up by some four footed or winged marauder. The two remaining fledglings permanently

¹ In his recently published 'History of The Birds of Colorado,' Mr. W. L. Slater mentioned (p. 182) a Golden Eagle's nest which measured 'six feet in diameter and nine feet high.'



YOUNG FERRUGINOUS ROUGH-LEGS BEFORE THEY COULD FLY.



1. A SAWTOOTH RIDGE AT NESTING SITE OF FERRUGINOUS ROUGH-LEG.

2. NESTLINGS OF FERRUGINOUS ROUGH-LEG.

left their nest on July 25, when about nine weeks old. While watching at this nest at 2 o'clock in the afternoon, Mr. Felton observed a Great Horned Owl flying along the cliff face in an easterly direction. The owl passed close to the nestlings, when one of the soaring hawks, presumably the female, was seen to swoop at, and strike the interloper, which thereupon dived obliquely to the ground. The hawk made two more dashes at the sitting owl, and a short squabble ensued each time between the birds, but when Mr. Felton reached the place the owl was nowhere to be seen and the hawk had returned to her nestlings. As the Great Horned Owl is a powerful and ferocious bird, which even attacks and eats large hawks (see Fisher, 'Hawks and Owls of the United States,' p. 175), it undoubtedly beat off its assailant without difficulty.

A second eyrie was also placed in the 'Chalk Cliffs,' in a similar situation, a mile to the east of the one above mentioned. This nest, which was two feet high and three feet in diameter, contained three eggs, one of which proved infertile. As in the case of the first eyrie described, a three weeks old nestling was evicted from its home on June 31, to fall fifty yards below on the steep hillside where it was found and restored to its nest by Mr. Felton. Its preserver had the satisfaction of witnessing the first flight of both birds on July 12. They were noticed to be very much on the alert, and Mr. Felton, desiring to obtain a photograph, crawled cautiously from above to within five yards of the nest. As he raised his Kodak both hawks took alarm, and boldly launched themselves from the eyrie in the direction of the creek below. After holding a straight course for about a quarter mile the fledglings seemed to lose heart; they circled right and left, and, again meeting, returned together to the cliff. So far their graceful flight had been marked with almost adult ease; but both betrayed inexperience when trying to alight and capsized awkwardly upon the ledge. Near this place a curious, unused eyrie of the Ferruginous Hawk was fixed against the vertical wall, to all appearance like a Cliff Swallow's nest, but the heavy structure was in fact supported by an invisible ledge.

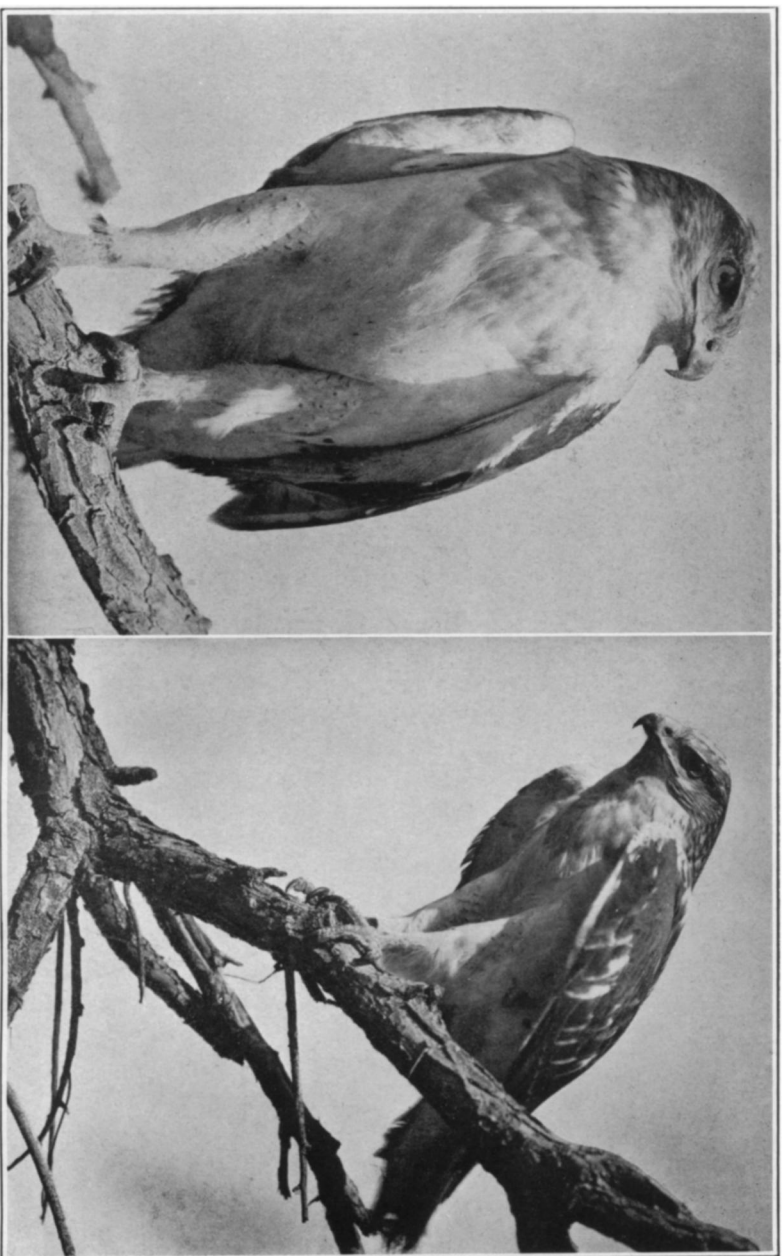
No. 3 eyrie was situated in the Surprise Creek brakes, and built upon a conical gumbo point which terminated a knife blade ridge some thirty-three yards below the bench above. From this nest there was a sheer fifty feet drop in front and at both sides. It was

a large straggling edifice, three feet high and the same in diameter at the most compact part. Near this eyrie were the four unoccupied nests above mentioned. When Mr. Felton first discovered this nest, on May 18, the female hawk was incubating four eggs, and the young birds of about a week old were found on June 6. At about a month old the nestlings were taken for pets by some Swede railroad contractors, greatly to the annoyance of the engineer, who desired that as many as possible of his protégés should be safely fledged. The young hawks were allowed full liberty in the contractor's camp and would fly away in the morning and return at night, but on July 28 they disappeared altogether. According to Mr. Felton's observations and my own the Ferruginous Hawk develops its flying powers very quickly, and I have known a two months old female of this species to take flights of from two hundred to three hundred yards without a wind. As with the genera *Aquila* and *Buteo*, the male is a week later than the female in acquiring the full power of flight.

The fourth eyrie, which contained four eggs, was placed upon the summit of a sand rock among pines, and here four birds were reared, which, as observed by Mr. Felton, took flight on July 17. This nest was not measured until the day of the final departure of its occupants, when it had settled so much as to be only a foot and a half high, although three and a half feet in diameter.

FOOD.

So far as I have been able to observe in Eastern Montana, the Ferruginous Rough-leg feeds chiefly upon prairie dogs and meadow-mice, though not averse to snakes. In my opinion it never takes frogs. Like Golden Eagles, these hawks often hunt amicably in pairs, and then appear to be more courageous, attacking mammals as large as jack-rabbits. On July 29, 1907, Mr. Lance Irvine, foreman of the Crown W. Ranch in Custer County, Montana, when out riding, surprised a pair of Ferruginous Rough-legs with a freshly killed jack-rabbit, which weighed about eight pounds, and could not therefore be carried away. From the description this pair would consist of a bird of the year with one of its parents. On



1. FULL FLEDGED FERRUGINOUS ROUGH-LEG, ABOUT SEVEN WEEKS OLD.
2. FEMALE FERRUGINOUS ROUGH-LEG NINE WEEKS OLD.

May 28, 1893, my wife and I witnessed the capture of a prairie dog by two of these hawks, and one of them was proceeding to devour it as we rode up. The methods of the crafty coyote and the Ferruginous Rough-leg are identical in 'dog-towns.' Both wait patiently, the hawk also on the ground, for a prairie dog to amble afield from its burrow, and thereupon make a dash, the first terrestrial, the latter aerial, to intercept it. A prairie dog always endeavors to gain its own burrow when danger threatens, and is marvellously quick to reach it, but if cut off from home, the beast becomes so bewildered that it neglects the nearer intermediate holes. When two coyotes, or two hawks hunt together, the fate of the intended victim is sealed, but with one assailant only, it has an even chance.

Mr. W. R. Felton made many valuable observations on the food habits of these hawks during the nesting season, and discovered the fact, new to science, that they prey upon birds as well as on mammals. Over the whole course of his observations until the young birds had flown, prairie dogs were found to largely exceed all other diet, but until the nestlings were about two weeks old their food consisted partly of Meadowlarks (*Sturnella neglecta*). While very little food was found in nest No. 1, taking into consideration the frequent visits paid to it, there were seen altogether: nine prairie dogs, one cotton-tail rabbit, two bull snakes, one thirty-one inches long, and some remains of Sharp-tailed Grouse and Meadowlarks. On two separate occasions, while Mr. Felton kept watch near this eyrie, the wary female frequently passed and repassed overhead with a Meadowlark in her talons, as subsequently identified. The bill of fare at all four eyries was similar, and Meadowlarks, as demonstrated by their down and feathers, were provided for the nestlings. The following interesting collection of remnants was seen at No. 4 nest. Four prairie dog skulls, the skeletons of two bull snakes, one of them being very large, the leg of a Sharp-tailed Grouse, the wing and scapulars of a Magpie, and the primaries of a Meadowlark. Grouse and Magpie remains were not found until July 17 and 21, and were proved by the feathers to belong to young birds, although I do not doubt that a Ferruginous Rough-leg would be quite capable of capturing an adult sitting grouse. When I was standing below the nest designated No. 1, on October 13, 1912, three Magpies alighted by it.

To the best of my knowledge this species never attempts to take poultry of any kind, and my own observations are strongly confirmed by Mr. W. P. Sullivan, for sixteen years manager of Mr. Milner's beautiful Square Butte Ranch, where these hawks have always been protected on account of the numerous gophers (*Thomomys*) which they destroy. As above narrated, several pair breed annually upon the ranch, and are constantly flying around the buildings, yet no chickens have ever been molested. Mr. Sullivan, who is a close observer of nature, considers that, after the young are flown in the fall, these hawks subsist chiefly upon gophers, and he has described to me (in lit.) their method of capturing them as follows:—

"I have watched the hawks often through glasses in our alfalfa field after the first crop has been taken off. The pocket gophers get pretty busy tunnelling, and pushing all the loose, damp earth up in piles on the surface. The hawks fly slowly over the field until they discover a fresh pile of damp earth. Here they will alight softly, and wait for the gopher to push close to the surface. They will then spread their wings, and, rising a few feet in the air, come down stiff-legged into the loose earth when the gopher is transfixed and brought out. I have seen them eat the gopher where caught, and at other times carry it away."

In the summer of 1903, about an acre of ground at the Square Butte Ranch was covered with piles of building material, such as lumber, posts, and heavy shed timbers which had been collected there the previous year. Numbers of cotton-tail rabbits lived under these piles, and provided an occasional meal both for the hawks and for the ranch cat, which was a female tabby. On a certain day Mr. Milner, owner of the ranch, happened to be engaged in conversation with Mr. Sullivan near a pile of posts upon which the cat was basking in the sun with one eye open for a chance rabbit as usual. A Ferruginous Rough-leg, with nestlings in the white cliffs, was gyrating low over the buildings, but neither the gentlemen nor the cat took particular notice of this familiar sight. Both men were, however, startled by a loud whirring noise, when to their intense surprise they saw that the hawk had lifted the now bewildered and struggling cat from her couch on the posts and was slowly bearing her aloft. It seemed at first to the astonished

spectators as though the hawk would actually succeed in disposing of this troublesome quarry, since it continued to rise easily with its burden to a height of about twenty-five feet. By this time however the fully aroused victim was stirred to a desperate effort, and it became clear that the audacious hawk had 'bitten off more than it could chew.' In Mr. Sullivan's words the tabby "twisted around, gave a terrible splutter and scream and clawed the hawk with a vengeance." The latter, flapping wildly, at once relaxed its grip, while pussy nothing loath, withdrew her claws, fell to the ground, and dashed under the posts. Numerous downy feathers, floating gently to the ground convinced the onlookers that the chagrined hawk had none the best of the encounter. Temporarily tired of cats, it now soared to a great height and returned with empty talons to the chalk cliffs. The cat in question was a very small one, and Montana cats are notably thin in summer; but, allowing for these facts, the victim must have weighed six pounds at least. Nevertheless, Mr. Sullivan feels sure that, had the cat behaved like the rabbit for which she was mistaken, the hawk would successfully have conveyed the quarry to its eyrie in the rocks. As the nest was two miles distant this would seem an extraordinary feat, and presumably transcend any hitherto published records of the kind. I quite admit that under favorable conditions of wind the female hawk might transport a five or six pound jack-rabbit to the eyrie; but that any cat-lifting hawk should ever surpass what this one achieved seems to me improbable. The dexterous application of the cat's raking claws would not fail to prevent it, as in the above remarkable instance.

Where a rabbit succumbs to the shock of the hawk's constricting grip, the agile and wiry feline, on the other hand, is stimulated to offer a desperate resistance, and like Mr. Sullivan's protégé is little the worse for the encounter. It cannot be told whether the hawk was mistrustful of rabbits after this event, but the cat became so suspicious of a flying object that she would race for the wood-pile if Mr. Sullivan threw his hat into the air.